BROADBAND TRANSMISSIONS ARE NOT "TELECOMMUNICATIONS"

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The FCC lacks authority to classify broadband internet services[1] as "telecommunications services," because broadband transmissions are not "telecommunications." The definition of "telecommunications" in 47 U.S.C. § 153(50) clearly distinguishes between (1) plain old telephone services (POTS) that are interconnected with the public switched telephone network (PSTN) and (2) packet switched services that are not interconnected with the PSTN. When determining whether a particular service is subject to common carriage obligations within the meaning of the Communications Act as enacted by Congress, arguments about the ownership of underlying network facilities, the "gatekeeper" status of intermediaries in the internet ecosystem, and the effects of different regulatory classifications on competition and innovation are definitionally *irrelevant*. It's unambiguous that a transmission is "telecommunications" within the meaning of 47 U.S.C. § 153(50) *only* if the transmission is capable of communicating with *all* circuit switched devices on the PSTN.[2]

Because broadband transmissions are not "telecommunications," broadband service is neither a "telecommunications service" nor an "information service." Like "cable service" was prior to the adoption of the 1984 Cable Act, broadband service is not defined by the Communications Act at all.

Broadband transmissions are not "telecommunications"

Unambiguous statutory language, decades of FCC and court precedent, and the structure of the Communications Act make it clear that broadband transmissions are *not* "telecommunications." A comprehensive statutory analysis of the FCC's authority to reclassify broadband service as a "telecommunications servic"" *must* begin with the meaning of "telecommunications" in 47 U.S.C. § 153(50), because "telecommunications service" is defined by

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[1] This paper does not use the term "broadband internet access service" because broadband service is an inherent part of the internet, not merely a means to "access" it. The term "access" is properly applied only in the context of dial-up services that use a PSTN call as means of accessing the internet.

[2] *See* Petition for Declaratory Ruling That AT&T's Phone-to-Phone IP Telephony Servs. Are Exempt from Access Charges, Order, FCC 04-97, 19 F.C.C. Rcd. 7457 at ¶ 12 (2004) (noting that "internetworking" conversions are still "telecommunications" if they are interconnected with the PSTN).

§ 153(53) as "the offering of 'telecommunications' for a fee directly to the public." There cannot be an "offering" of "telecommunications" without an underlying "telecommunications" transmission. An analysis of whether broadband internet access services "offer" "telecommunications" is thus a condition precedent to classifying broadband internet service as a "telecommunications service."

Neither the FCC nor the courts have analyzed whether broadband transmissions are "telecommunications"

As a matter of established precedent, whether broadband transmissions are "telecommunications" is an open question. The issue has never been squarely decided by the FCC or the courts.

The definition of "telecommunications" in the Communications Act was based on the FCC's distinction between "basic" and "enhanced" services in its Final Decision in the *Computer II* proceeding[3] and the terms of the Modified Final Judgement (MFJ)[4] that broke up the Bell System telephone monopoly.[5] The FCC conducted an in-depth analysis of the statutory definition of "telecommunications" in 1998, during the height of the dial-up era, and determined that "telecommunications" is "a simple, *transparent* transmission path, without the *capability* of providing enhanced functionality."[6] The FCC further concluded that, "by contrast, when an entity offers *transmission* incorporating the 'capability for generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information,' it does *not* offer

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[3] *See* Amendment of Section 64.702 of the Commission's Rules and Regulations (Second Computer Inquiry), Final Decision, FCC 80-189, 77 F.C.C.2d 384 (1980) ("*Computer II*").

[4] *See generally United States v. American Tel. & Tel. Co.*, 552 F. Supp. 131 (D.D.C. 1982), *aff'd sub nom. Maryland v. United States*, 460 U.S. 1001, 103 S. Ct. 1240, 75 L. Ed. 2d 472 (1983) *and modified sub nom. United States v. W. Elec. Co., Inc.*, 890 F. Supp. 1 (D.D.C. 1995) *vacated*, 84 F.3d 1452 (D.C. Cir. 1996) *and amended sub nom. United States v. W. Elec. Co., Inc.*, 714 F. Supp. 1 (D.D.C. 1988) *aff'd in part, rev'd in part sub nom. United States v. W. Elec. Co.*, 900 F. 2d 283 (D.C. Cir. 1990).

[5] *See* Fed.-State Joint Bd. on Universal Serv., Report to Congress, FCC 98-67, 13 FCC Rcd. 11501, ¶ 13 (1998) ("*Universal Service Report*") (determining that Congress intended the statutory terms 'telecommunications,' 'telecommunications service,' and 'information service' to be interpreted consistently with *Computer II* and the MFJ).

[6] *Id.* at ¶ 39 (emphasis added).

telecommunications."[7] The FCC thus recognized that some, but not all, communications transmissions qualify as "telecommunications" and concluded that: (1) "telecommunications" are plain old telephone transmissions on the PSTN, (2) that "telecommunications services" are the offering of plain old telephone transmissions using the PSTN, and (3) all other (non-POTS related) services that are offered "via" the PSTN are "information services."

As explained below, this interpretation of "telecommunications" clearly fits the PSTN portion of dial-up internet connections but clearly does *not* fit broadband transmissions (irrespective of whether those transmissions occur in the internet's 'backbone' or in the 'last mile'). Neither the FCC nor the courts, however, have expressly analyzed whether broadband transmissions fall within the definition of "telecommunications" in 47 U.S.C. § 153(50). They have merely assumed that broadband transmissions meet this analytical condition precedent to "telecommunications service."

The FCC had an opportunity to analyze this condition precedent when it issued the *Advanced Services Order*, which classified xDSL service as a "telecommunications service." But the FCC instead chose to assume without analysis that broadband xDSL transmissions are "telecommunications."[8] With respect to whether xDSL transmissions are "telecommunications," the *Advanced Services Order* merely repeated the statutory definition:

> To the extent that an advanced service does no more than transport information of the user's choosing between or among user-specified points, without change in the form or content of the information as sent and received, it is "telecommunication," as defined by the Act.[9]

The FCC made no attempt to determine whether or to what "extent" xDSL transmissions actually do "more" than that. As discussed in detail below, however, xDSL and all other broadband transmissions do much more than "telecommunications."

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[7] *Id.* (emphasis added).

[8] *See* Deployment of Wireline Servs. Offering Advanced Telecommunications Capability, 13 FCC Rcd. 24012 at ¶ 35 (1998) ("*Advanced Services Order*").

[9] *Id.*

The *Advanced Services Order's* assumption that xDSL transmissions are "telecommunications" (to some unspecified "extent") has never been fully examined by a federal court of appeals. The assumption was not reviewed on appeal from the *Advanced Services Order*, because the court remanded that case without addressing the merits.[10] In turn, the FCC did not address the assumption in its order on remand, and thus, the issue was not considered in the subsequent appeal of the order on remand either.[11]

The FCC again assumed without analysis that broadband transmissions are "telecommunications" in the *Cable Modem Order*, which classified broadband internet access offered by cable operators as an "information service."[12] The FCC instead skipped straight to an analysis of whether cable operators were "offering" "telecommunications service" and found that cable modem service is a single, integrated service that does not offer a separate "telecommunications service" to end users.[13]

When the Supreme Court reviewed the *Cable Modem Order* in *Brand X*, the Court thus addressed a very limited issue: "whether cable companies providing cable modem service are providing a 'telecommunications service' in *addition* to an 'information service.'"[14] The Court did not address whether cable modem *transmissions* are "telecommunications" because the parties had *conceded* the issue.[15] The Court noted that the FCC's conclusion that cable modem service is an "information service" was "unchallenged here,"[16] and that the FCC "conceded that, like all information-service providers, cable companies use 'telecommunications' to provide consumers

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[10] *See US W. Commc'ns, Inc. v. FCC*, 1999 WL 728555 (D.C. Cir. 1999).

[11] *See generally* Deployment of Wireline Servs. Offering Advanced Telecommunications Capability, First Report and Order and Further Notice of Proposed Rulemaking, FCC 99-48, 14 F.C.C. Rcd. 4761 (1999).

[12] *Cable Modem Order* at ¶ 7 (2002).

[13] The FCC relied on its previous conclusion in the *Universal Service Report* that "internet access service is appropriately classified as an information service, because the provider offers a single, integrated service, internet access, to the subscriber." *Cable Modem Order* at ¶ 36.

[14] *See Nat'l Cable & Telecommunications Ass'n v. Brand X Internet Servs.*, 545 U.S. 967, 986 (2005) ("*Brand X*").

[15] *See Brand X*, 545 U.S. at 987-88.

[16] *Id*. at 987.

with Internet service."[17] Because the parties conceded that broadband internet access includes a "telecommunications" "transmission component," the Court framed the issue as "whether the transmission component of cable modem service is sufficiently integrated with the finished service to make it reasonable to describe the two as a single, integrated offering."[18]

It was this framing — driven by the parties — that prompted Justices Scalia, Souter and Ginsberg to dissent in *Brand X*. Justice Scalia wrote that "the analytic problem pertains not really to the meaning of 'offer,' but to the identity of what is offered."[19] By "identity," Scalia was referring to whether it was reasonable for consumers to separately identify the "individual components" of the cable modem service "package,"[20] not the identity of broadband transmissions as "telecommunications." Like the parties and the Court, the dissenting justices assumed without deciding that cable modem transmissions meet the statutory definition of "telecommunications."

In its *Open Internet Remand*, the FCC interpreted *Brand X* as permitting the agency to ignore altogether the Act's separate, statutory definition of "telecommunications."[21] In the *Open Internet Remand*, the FCC decided that, "regardless of the technological platform over which the service is offered," the only statutory question it must address is how a consumer perceives the "offer" in § 153(53)'s definition of "telecommunications service."[22] The *Open Internet Remand* thus interpreted *Brand X* as reading the definition of "telecommunications" out of the statutory scheme.

In *USTA v. FCC*, the D.C. Circuit Court of Appeals had no reason to question the FCC's approach to *Brand X* because, like the parties in *Brand X*, the parties in *USTA v. FCC* conceded that broadband transmissions are 'telecommunications.' Rather than dispute the FCC's

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[17] *Id*. at 988.

[18] *Id*. at 990.

[19] *Brand X* at 1006 (J Scalia joined by JJs Souter and Ginsberg, dissenting).

[20] *See id*. at 1006-1007.

[21] *Open Internet Remand* at ¶ 331.

[22] *Id*.

extraordinarily broad reading of *Brand X*, the appellant argued that "broadband is unambiguously an information service,"[23] which, by statutory definition, means the appellant conceded that broadband transmissions constitute "telecommunications"[24]).

In sum, whether broadband transmissions are "telecommunications" is an open question.

The statutory definition of "telecommunications" is not ambiguous

The text of § 153(50), decades of FCC and court precedent, and the structure of the Communications Act make clear that broadband transmissions do not fall within the definition of "telecommunications."

It is unambiguous that the definition of "telecommunications" does not distinguish between services and facilities. Neither term is used in the definition, and no such distinction has otherwise been made in the Communications Act. As the Supreme Court noted in *Brand X* with respect to the definition of "telecommunications service," the definition "says nothing about imposing more stringent regulatory duties on facilities-based information-service providers,"[25] and neither does the definition of "telecommunications." To conclude that this definitional silence somehow creates ambiguity would amount to "ingenuity to create ambiguity" that simply does not exist in the statute.[26]

It is also unambiguous that the definition of "telecommunications" is not a catch-all into which the FCC can stuff any type of communications transmission over which the FCC wishes to exercise authority. The definition of "telecommunications" was clearly not intended to encompass *all* types of communications transmissions. The Act describes the purpose of the FCC as "regulating interstate and foreign commerce in *communication* by wire and radio" to make available "wire and radio communication service," *not* the regulation of "telecommunication" to

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[23] *See United States Telecom Ass'n v. FCC*, 825 F.3d 674, 701 (D.C. Cir. 2016).

[24] *See* 47 U.S.C. § 153(24) (defining 'information service' as an offering provided "via telecommunications").

[25] *See Brand X*, 545 U.S. at 997-98.

[26] *See United States v. James,* 478 U.S. 597, 604(1986), quoting *Rothschild v. United States,* 179 U.S. 463, 465 (1900).

make available a "telecommunications service."[27] The term "telecommunication" was obviously intended to describe a subset of communications transmissions. For example, the Communications Act expressly defines a "cable system" as a facility "consisting of a set of closed *transmission* paths and associated signal generation, reception, and control equipment" that is offered to the public, but is *not* subject to Title II.[28] If all communications transmissions were "telecommunications," the definition of "cable system" — indeed, the Act's entire definitional schema — would be nonsensical.

Finally, there is nothing in the text of the definition of "telecommunications" or its regulatory and legislative history that suggests it was intended encompass transmission types beyond those that are interconnected with the public switched telephone network. Section 153(50) defines "telecommunications" as "the [1] ***transmission***, between or among [2] ***points specified by the user***, of [3] ***information of the user's choosing***, [4] ***without change in the form or content*** of the information as sent and received."[29] The definition of "telecommunications" is thus comprised of four conjunctive elements:

1. It is a transmission (not a facility, "last mile" or otherwise);
2. The transmission must be between or among points that are specified by the user;
3. The information must be of the user's choosing; and
4. The transmission must not change the form or content of the information sent or received.

Though a traditional transmission over the public switched telephone network meets all four elements of this definition, a broadband transmission clearly does not. Indeed, a broadband transmission bears no resemblance whatsoever to the "basic" transmission service defined by the FCC in the *Computer Inquiries*.

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[27] 47 U.S.C. § 151.

[28] *See* 47 U.S.C. § 522(7).

[29] 47 U.S.C. § 153(50) (emphasis added).

Circuit switched, POTS telephone users specify points of transmission

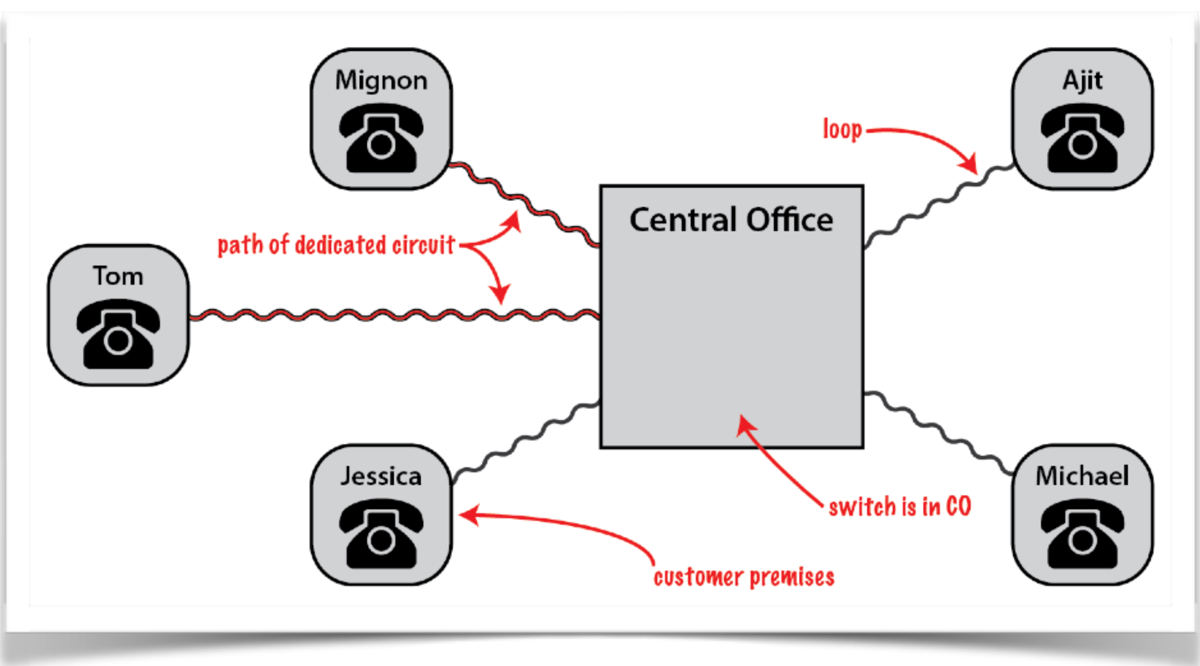
Topology of the Public Switched Telephone Network

The following discussion describes the topology of the PSTN. Understanding this topology is a useful to understanding why a POTS user specifies the points of a telephone call *merely by dialing a telephone number*.

The earliest telephone communications used a full-period circuit in which all telephones were connected to a single telephone line, a system that lacked privacy and was limited in scale (because a call between any two users effectively denied service to all others connected to the same line). Within a few years of the telephone's invention, the Bell System addressed scale and privacy issues through centralized circuit switching. In this topology, each residence and business (or "customer premises") is typically connected by a dedicated, private line (or "loop") to a switchboard (or "switch") located in a facility ("central office" or "CO") near the center of a local network (which minimizes loops lengths). The switch connects one loop to another loop to establish a dedicated circuit for the duration of the call.

For example, if Tom called Mignon on the switched network depicted in Figure 1, the switch would connect Tom's loop to Mignon's loop to set up the call. During the call, the circuit

Figure 1. Switched Network



formed by their loops would be dedicated to their conversation only. The switch would disconnect their loops only when Tom or Mignon hangs up.

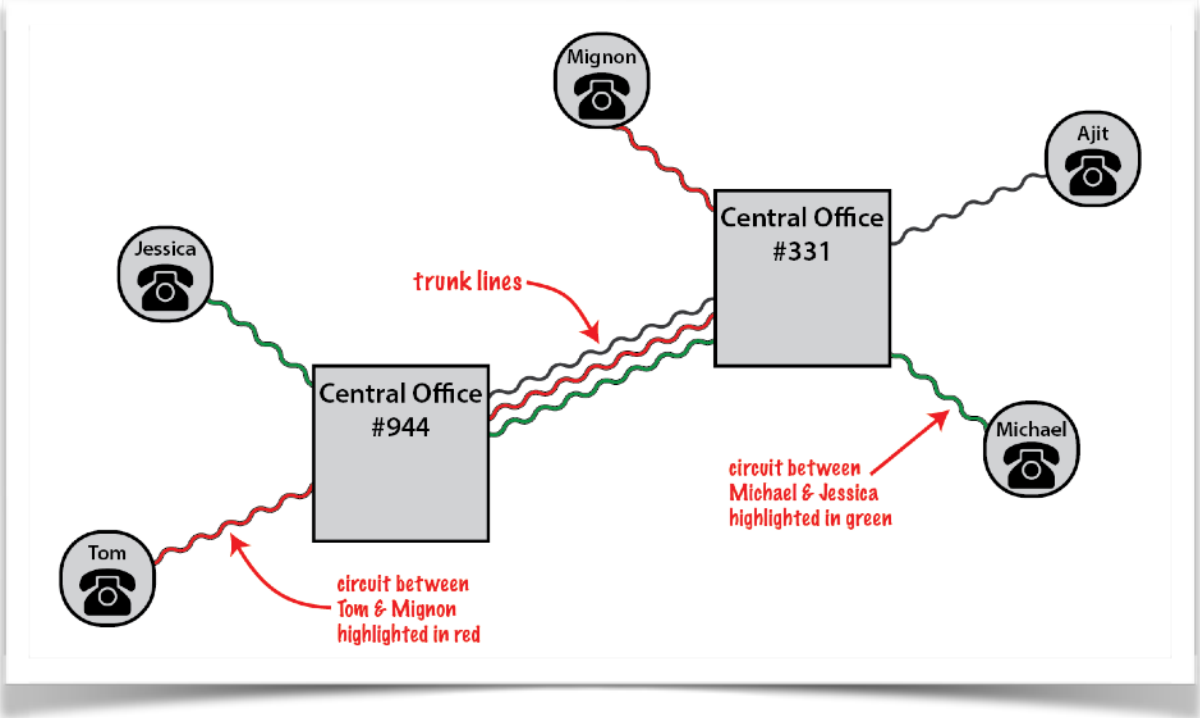
Centralized switching works well in relatively small geographic areas, but in areas that require long loop lines, centralized switching is uneconomical. The Bell System's solution was to keep the areas served by central offices relatively small (about three miles in radius) and to interconnect central offices with "trunk" lines. Whereas subscriber loops are typically dedicated access circuits that connect customer premises to the central office, trunks are shared because only a small percentage of loops are typically in use simultaneously. Though trunks are shared, each call still receives a dedicated circuit. When the central office switches a loop to an unused trunk, it reserves (or "seizes") the trunk for the duration of the call. When the call is disconnected (because a party hangs up), the trunk is "released" for use in another call.

Communications between central offices are connected by switching the loop of the calling party at the initiating central office to a trunk line connecting to the terminating office, which then switches the trunk to the loop of the party being called.

For example, when Tom calls Mignon using the network depicted in Figure 2, Central office #944 is the initiating central office, which seizes the trunk line highlighted in red and switches Tom's loop to it. Central office #331 is the terminating central office that switches Mignon's loop to the trunk highlighted in red to complete the circuit. This circuit will remain dedicated to the call between Tom and Mignon for its duration.

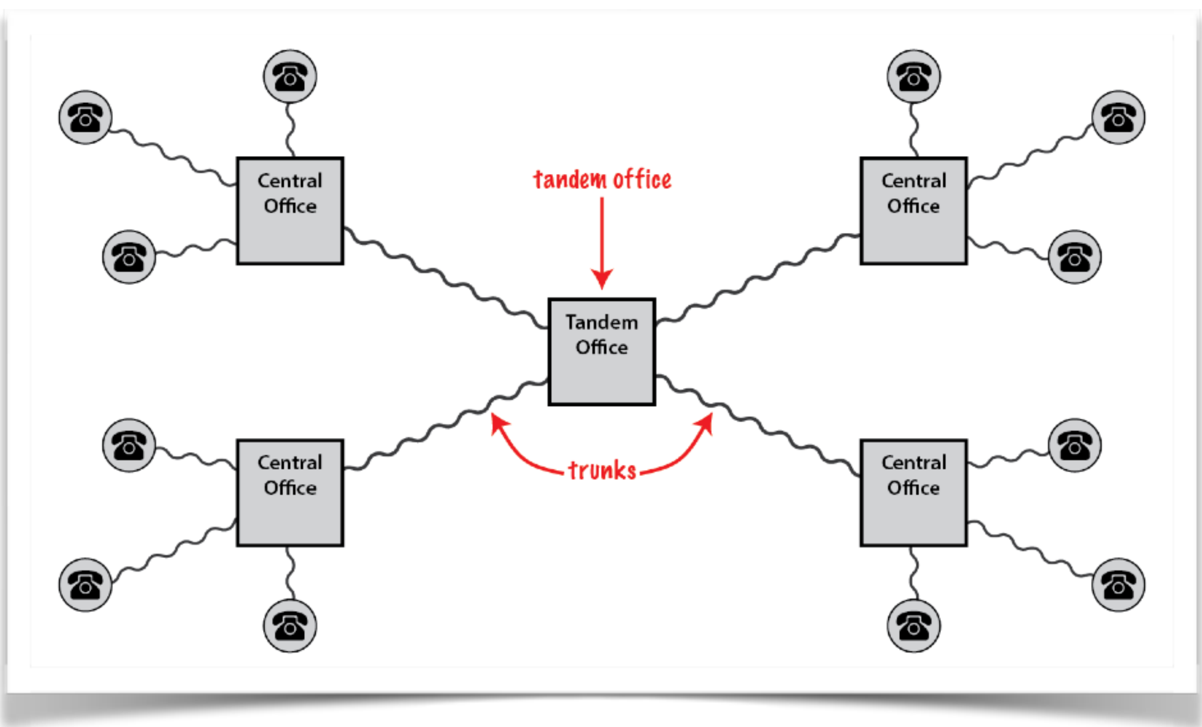
Similarly, when Michael calls Jessica using the network depicted in Figure 2, central office #331 is the originating central office, Central office #944 is the terminating central office, and the trunk line highlighted in green is dedicated to their call. If the trunk highlighted in green had already been in use, the switch in central office #331 would have seized another trunk (in this example, the unhighlighted trunk).

Figure 2. Trunk Lines



In larger cities, multiple central offices are connected by "tandem offices" (or "tandem switches") that only switch trunk lines and cannot originate or terminate a call. The use of tandem offices avoids the need to directly interconnect all central offices in a local area.

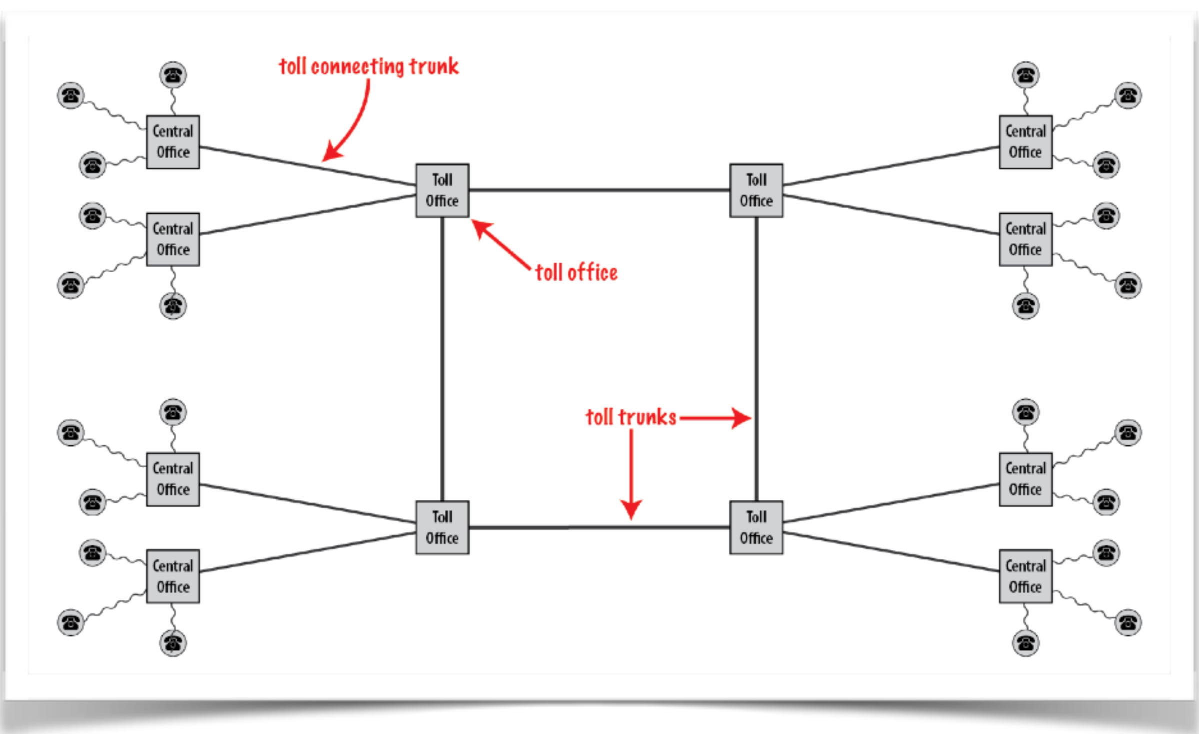
Figure 3. Tandem Office



The centralized local switching topology described above is typically used within a city and/or its immediate area. The network within such an area is known as an "exchange." Calls made within an exchange area are usually included within the basic telephone subscription price (i.e., there is no additional charge to make a local call within the same exchange area).

Calls between exchanges (known as "toll," "long distance," or "interexchange" calls) use the "long distance" network, which is an extension of the "local tandem" network topology used in larger local exchange areas. Exchanges are connected to other cities using long distance (or "toll") trunk lines. An exchange sends a long distance call through the local "toll office" (or "interexchange office") which handles billing for long distance calls (because long distance calls were traditionally not covered by the basic subscription price). The toll office (which might be merely a specially equipped portion of the switchboard in an exchange with a single central office), then switches the call to the appropriate intercity line, either directly or through an "access tandem." A simple long distance network is depicted in Figure 4. (The toll trunks are represented by smooth rather than wavy lines to indicate that the trunks are actually bundles of multiple twisted copper pairs.)

Figure 4. Long Distance Network



North American Numbering Plan

Telephone numbers function as the addresses of customer premises (e.g., residential telephone loops), individual subscriber telephones (i.e., a different telephone number is assigned to each mobile device),[30] or other telephony endpoints. The basic numbering scheme for the PSTN was developed by the Bell System, which settled on the use of ten digit telephone numbers in 1947.[31] This ten-digit numbering scheme became known as the North American Numbering Plan (NANP), and was administered by AT&T until it divested its operating companies in 1984, at which time the NANP's administration was transferred to another company.[32] The NANP applies in all regions where the international country code is "1".[33]

The format for a 10 digit telephone number is divided into 3 parts represented as NXX-NXX-XXXX, in which "N" represents any digit from 2 through 9 and "X" represents any digit from 0 through 9 (the "N" digits are limited in order to save 0 for calling an operator and 1 for signaling a long distance call).

- The first three digits are the "Numbering Plan Area" code (or "NPA" code). Most NPA codes are assigned to a particular exchange area and are thus commonly known as "area codes."[34]

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[30] *See* Interconnection Between Wireline Tel. Carriers & Radio Common Carriers Engaged in the Provision of Domestic Pub. Land Mobile Radio Serv. Under Part 21 of the Commission's Rules, Memorandum Opinion and Order, FCC 77-61, 63 F.C.C.2d 87, 93 (1977) (determining that a telephone number would be assigned to each mobile device).

[31] *See* Admin. of the N. Am. Numbering Plan, Notice of Inquiry, FCC 92-470, 7 FCC Rcd. 6837, ¶ 4 (1992).

[32] *See id.* (citing *United States v Western Electric Company*, 569 F. Supp. 1057 (D.D.C. 1983).

[33] The international public telecommunication number plan is defined by recommendation E.164 of the Telecommunications Standardization Sector (ITU-T) of the International Telecommunication Union, a specialized agency of the United Nations.

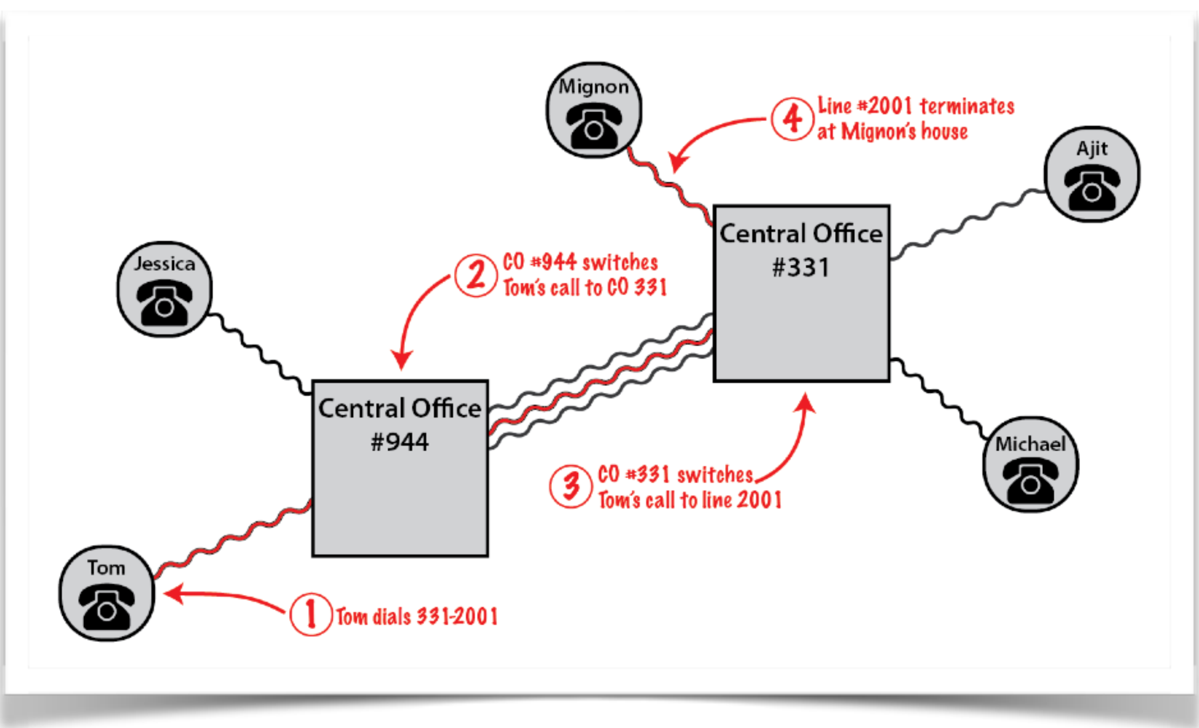
[34] *See* Admin. of the N. Am. Numbering Plan, Notice of Inquiry, FCC 92-470, 7 FCC Rcd. 6837, ¶ 8 (1992). The exceptions are NPA codes with the format N00 (i.e., 200, 300, 400 . . . 900), known as "Service Access Codes," and NPA codes with the format N11 (i.e., 211, 311 . . . 911), known as "Service Area Codes." *Id.* at ¶ 9.

- The three digits following the area code are are known as the "central office" or "office" code and are assigned to a specific central office within an exchange.[35]
- The final four digits are are known as "line" or "station" codes and are assigned to a specific local loop or "station" (e.g., a mobile device such as cellular phone or tablet).

Dialing a telephone number thus specifies the endpoints of a call on the analog PSTN, because a telephone number uniquely identifies (1) a specific exchange area (via the area code), (2) a specific central office (via the office code), and (3) a specific local loop or station (via the line or station code) that is dedicated to a specific customer premises (e.g., a residential address) or device (e.g., a specific mobile device).

For example, when Tom dials the 7 digit number "311-2001" to call Mignon using the local exchange network depicted in Figure 5, the PSTN's signaling system knows that Tom's call must be routed through the central office that has been assigned the office code "311" and that Tom wants to reach the subscriber of a loop served by that office that has been assigned the line code "2001," which terminates at a known point (Mignon's home).

Figure 5. Local Telephone Call



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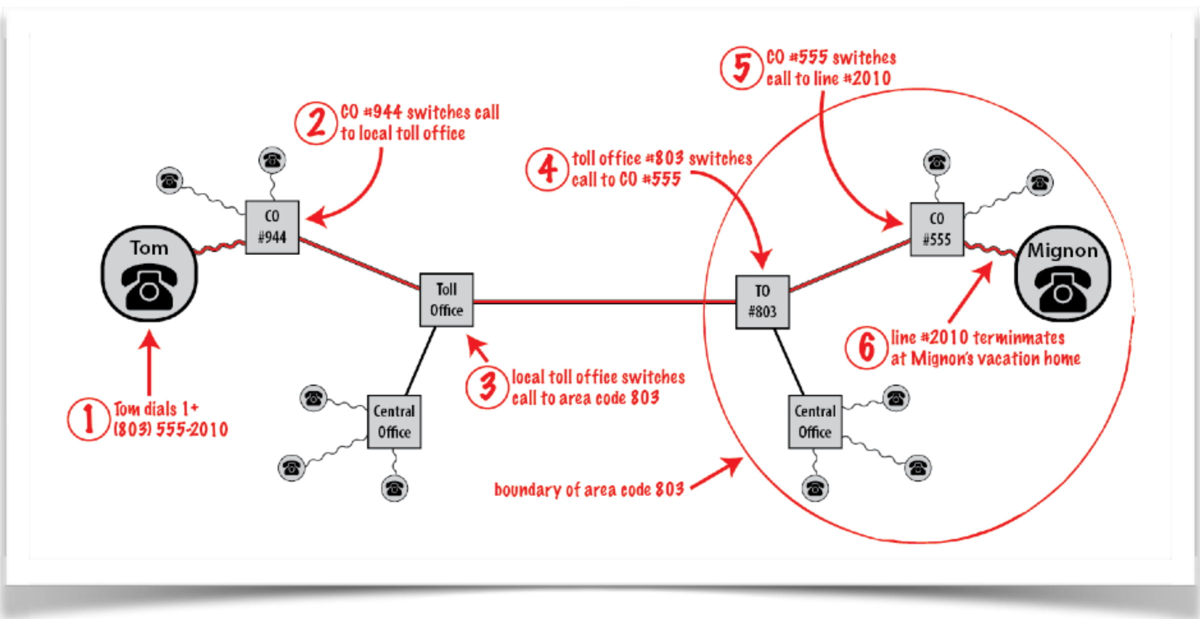
35 *See id.* at ¶ 10.

Assume Tom wants to place a long distance call to Mignon's vacation home at telephone number (803) 555-2010. In this example, illustrated in Figure 6, Tom would first dial a 1 to signal that he intends to make a long distance call. Central office #944 would then switch the call to the toll office in Tom's local exchange. That toll office would switch the call to the toll office in area code 803, and the toll office in area code 803 would switch the call to central office #555. Central office #555 would then switch the call to line #2010, the local loop that terminates at Mignon's vacation home.

Figure 6. Long Distance Telephone Call



Local Number Portability

Though the the first 6 digits of a 10-digit telephone number (the "NPA-NXX") historically identified the address of a specific telephone switch, today the NPA-NXX number often identifies only the switch to which the number was originally assigned. The development of digital signaling (using the standard known as "SS7") has enabled local number portability (or "LNP"), which allows users to keep their 10-digit NANP number when they switch telecommunications service providers. Local number portability is accomplished by assigned a Location Routing Number (or "LNR") to each ported NANP telephone number. For a ported number, the Location

Routing Number replaces the NPA-NXX as the address of the serving switch, but the LNR does *not* change the specified endpoint of the call.

When a call is made to a ported telephone number, the initiating switch launches a query to its LNP call routing database to determine whether the telephone number has been ported. If the number has been ported, the database response provides the switch with the LRN needed to terminate the call. If the number has not been ported, the database response indicates that the call should be routed based on the NANP telephone number. In either case, the call is connected to the subscriber's specific loop (i.e., current residence) or a subscriber's specific station (i.e., mobile device), and the geographic location of the terminating office is known.

Endpoints in Mobile Telephony

Though figures 1 through 6 above describe analog switching and signaling on the wired PSTN, the interconnection of mobile devices with the PSTN does not change the fact that when a user dials a telephone number, the user is specifying the endpoints of the call. When it established the cellular communications service in the early 1980s, the FCC distinguished common carrier mobile services from private mobile services based on interconnection with the PSTN. For example, the FCC imposed common carrier obligations on cellular services because they could provide "users with interconnected service over the public telephone network," which made cellular service "an important adjunct to, and extension of, the public switched network."[36] The FCC determined that cellular carriers are "generally engaged in the provision of local exchange telecommunications in conjunction with the local telephone companies and are therefore 'co-carriers' with the telephone companies."[37] It also determined that cellular carriers were not "interexchange carriers" subject to the imposition of access charges for exchange access and were

[36] *See* Inquiry into the Use of the Bands 825-845 Mhz & 870-890 Mhz for Cellular Commc'ns Systems, Report and Order, FCC 81-161, 86 F.C.C.2d 469, ¶¶ 34, 54 (1981).

[37] The Need to Promote Competition & Efficient Use of Spectrum for Radio Common Carrier Servs., Memorandum Opinion and Order, FCC 86-85, 59 Rad. Reg. 2d (P & F) 1275, ¶ 12 (1986).

also not "end users" subject to subscriber line charges, because the FCC had consistently treated mobile radio services as local in nature.[38]

Mobile carriers that are interconnected with public switched telephone network rely on the NANP and circuit switching to establish mobile phone calls in the same way as the wired public switched telephone network.[39] In its first order addressing jurisdictional issues related to the interconnection of cellular networks with the PSTN, the FCC explained that the cellular service was designed as a self-contained telephone network whose users were interconnected through a central switch (the "mobile telephone switching office" or "MTSO") designed to function as a regular central office switch in the landline telephone network.[40] A mobile network's MTSO could thus be interconnected with the PSTN as easily as any other newly opened central office.[41]

Because each mobile device is assigned a unique 10-digit telephone number, a user who dials a telephone number assigned to a mobile device specifies the endpoint of the call in the same way as call to a landline telephone number — the endpoint of the call is the specific mobile device assigned to the 4-digit station number dialed by the user. Although the geographic location of a mobile telephone may not be known with absolute precision, the precise geographic location of the MTSO and the base transceiver station ("BTS" or "base station," commonly known as a wireless tower) that "terminate" the connection to the mobile telephone are both known. In any event, a PSTN call to a mobile telephone will *always* attempt to connect to the specific mobile device associated with the 10-digit NANP number dialed by the user. If the network cannot

[38] *See* MTS and WATS Market Structure, Memorandum Opinion and Order, FCC 84-36, 97 F.C.C.2d 834, ¶¶ 144-50 (1984).

[39] *See generally* The Need to Promote Competition and Efficient Use of Spectrum for Radio Common Carrier Services, Declaratory Ruling, FCC 87-163, 2 FCC Rcd. 2910 (1987) (addressing jurisdictional issues related to the interconnection of mobile telephone switching offices with the PSTN).

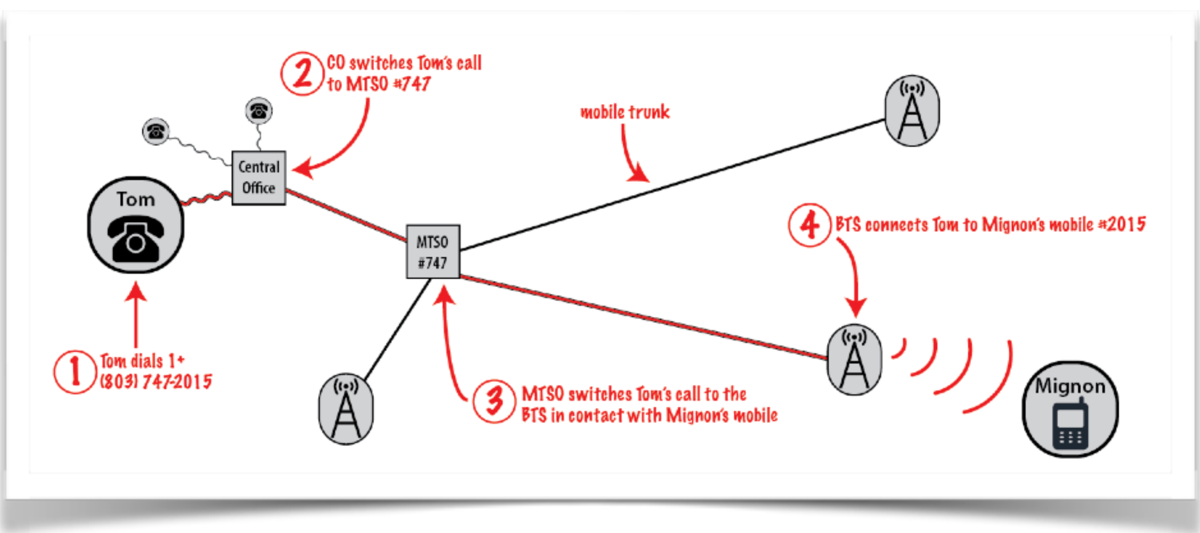
[40] *See id.* at ¶ 31.

[41] *See id.* Alternatively, mobile carriers could connect to the PSTN like a private branch exchange (or "PBX"). *See id.* at n. 16.

connect to the specified mobile device, the call will not be connected at all. A user who dials a mobile telephone number is thus specifying a known endpoint for termination of the call irrespective of the mobile phone's precise physical location.

Assume Tom uses his landline telephone to call Mignon's mobile telephone number, (803) 747-2015, using the network depicted in Figure 7. After Tom dials the number, the initiating central office switches the call to the MTSO assigned the NXX number 747. The MTSO switches Tom's call to the base transceiver station ("BTS" or "base station") that has the strongest connection with Mignon's mobile phone (station number 2015), and the BTS connects the call. The critical point in this example is that the call would be completed to Mignon's specific mobile device no matter where it was located geographically, so long as it could establish a connection with a base station and MTSO that could terminate the call. The endpoint of a call made to Mignon's mobile telephone number on the PSTN will *always* be Mignon's mobile telephone and the location of its terminating office will *always* be known.

Figure 7. Mobile Telephone Call

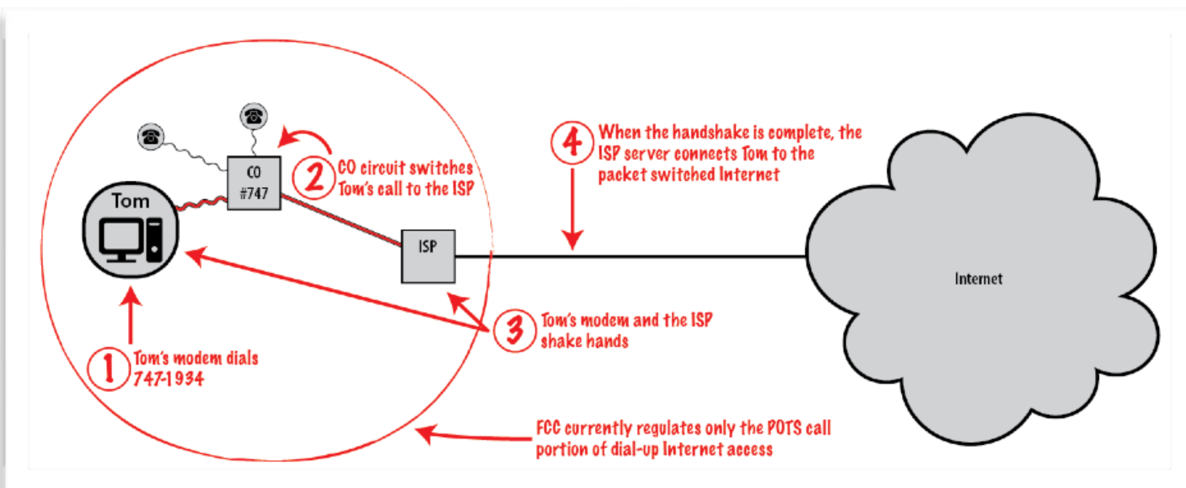


Endpoints on the Dial-Up Internet

A user of dial-up internet service specifies a specific endpoint for the initial dial-up call in the same way as a user makes an ordinary telephone call. To establish an internet connection, dial-up users make an ordinary, analog telephone call by dialing a 7-digit local telephone number

(NXX-XXXX) that is assigned to a “toll free” business line that is connected to the ISP’s server.[42] Once the call is switched to the ISP’s server, the server performs a “handshake protocol” with the user’s modem to authenticate the user’s access and connect the user to the internet (the handshake is why a dial-up modem produces strange chirping noises when it first tries to connect). A dial-up connection to the internet is only established *after* the telephone call is connected to the ISP’s server and the handshake is complete. Only then does the ISP server begin performing the function of converting the circuit-switched voice call data to the packet-switched communications used by internet routers.[43] A dial-up internet connection thus *originates* as a telephone call on the PSTN, as illustrated in Figure 8, in order to *access* internet communications networks.

Figure 8. Dial-Up Internet Service



The dial-up internet’s reliance on an ordinary telephone call for access is why all “information services” in the dial-up era were delivered “via telecommunications.” But, the *only* portion of the underlying “transmission” of dial-up internet access that meets the definition of

[42] Dial-up ISPs traditionally leased this local loop from the incumbent telephone company at a government-regulated flat monthly rate. *See Bell Atl. Tel. Companies v. FCC*, 206 F.3d 1, 4 (D.C. Cir. 2000).

[43] Even after the ISP has establish a connection to the internet, the communications between the ISP’s switch and the user’s dial-up modem still transmits information using audible tones like those used to set up an ordinary POTS call (different tones represent different binary digits in a manner similar to the dots and dashes used in Morse code).

"telecommunications" in 47 U.S.C. § 153(50) is the portion of the transmission from the customer's premises to the ISP's switch. This is so because it is the *only* portion of the transmission for which the user specifies endpoints by dialing the ISP's local telephone number. That is why this is the only portion of dial-up internet access that the FCC has regulated since *Computer II*, even though the internet backbone shared many of the same long distance *facilities* that were subject to Title II regulation when they were used to provide telephone interexchange service.

Additional FCC and judicial precedent also makes this point clear.

When the telephone monopoly was dismantled in 1983, the FCC required that "interexchange carriers" (i.e., long distance telephone companies) pay "access charges" to "local exchange carriers" (LECs) to keep basic telephone rates low while ensuring LECs received sufficient revenue to maintain the infrastructure of local telephone exchanges (which had previously been maintained through monopoly rents). The FCC temporarily exempted "enhanced service providers" from paying access charges in order to avoid a "bill shock" to data users.[44] This "ESP exemption" was initially intended to be temporary, because it "forced [telephone subscribers] to bear a disproportionate share of the local [telephone] exchange costs that access charges [were] designed to cover."[45] The FCC subsequently extended the ESP exemption indefinitely – despite its discriminatory impact on telephone subscribers who didn't use data services (which were mostly used by big businesses at that time) – because the market for data services was still emerging. The FCC concluded that, "to the extent the exemption for enhanced service providers may be discriminatory, it remains, for the present, not an unreasonable discrimination."[46]

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[44] *See* MTS and WATS Market Structure, Memorandum Opinion and Order, FCC 83-356, 97 FCC 2d 682 (1983).

[45] *See* Amendments of Part 69 of the Commission's Rules Relating to Enhanced Service Providers, Order, FCC 88-151, 3 FCC Rcd. 2631, ¶ 2 (1988).

[46] *Id.* at ¶ 19 (1988).

After the 1996 Act was passed, the FCC converted the "ESP" exemption into the information service provider (or "ISP") exemption, which exempted independent "dial-up" internet service providers from paying access charges and the per-minute rates applicable to interstate "telecommunications services" (i.e., long distance telephone calls).[47] The FCC treated "over the top" dial-up ISPs as local "end user" customers and permitted them to lease lines from telephone companies at the significantly lower, flat monthly rates applicable to business lines used for local calls. Because dial-up ISPs could pay a flat monthly rate for unlimited data traffic rather than the per-minute charges that were then applicable to consumers' long distance telephone calls, ISPs offered unlimited dial-up internet access to consumers at flat monthly rates that were artificially low in comparison to the rates charged for long distance telephone service. As a result, consumers who subscribed to telephone services paid "subscriber line charges" and higher per-minute long distance rates to cover costs to local exchange networks that were caused by dial-up ISPs and their subscribers. Even telephone subscribers who were not using internet services were in effect required by law to subsidize dial-up ISPs.

Although treating dial-up internet traffic as "local" meant that ISPs did not have to pay access charges (which apply only to interstate telephone calls), the 1996 Act introduced a new payment type — "reciprocal compensation" — that was designed to apply to the exchange of local calls between different carriers. The states, which have jurisdiction over local calls only, interpreted this provision as requiring that dial-up ISPs pay reciprocal compensation for their share of the costs involved in maintaining local telephone exchanges.

The FCC quickly issued an order to preempt the states from requiring ISPs to pay reciprocal compensation. It based its preemption on jurisdictional grounds by concluding that dial-up ISP-bound traffic is inherently interstate.[48] The FCC concluded that the internet could not

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[47] *See* Access Charge Reform, First Report and Order, FCC 97-158, 12 FCC Rcd. 15982 (1997).

[48] *See* Implementation of the Local Competition Provisions in the Telecommunications Act of 1996 and Inter-Carrier Compensation for ISP-Bound Traffic, Declaratory Ruling and Notice of Proposed Rulemaking, FCC 99-38, 14 FCC Rcd. 3689 (1999).

be separated into an "intrastate telecommunications service" (the call from the consumer to the dial-up ISP's local server) and an "interstate information service" (the internet access provided by the ISP's local server), because the definition of "information services in the 1996 Act recognizes the inseparability, for purposes of jurisdictional analysis, of the information service and the underlying telecommunications." The FCC thus required states to treat dial-up ISP traffic as local for pricing purposes and as interstate (i.e., long distance) for jurisdictional purposes. The FCC justified this result by noting the "strong federal interest in ensuring that regulation does nothing to impede the growth of the internet – which has flourished to date under our 'hands off' regulatory approach – or the development of competition."[49]

The D.C. Circuit vacated and remanded the FCC's jurisdictional ruling "for want of reasoned decisionmaking."[50] The court emphasized the critical difference between circuit-switched and pack-switched networks with respect to endpoints:

> In a conventional "circuit-switched network," the jurisdictional analysis is straightforward: a call is intrastate if, and only if, it originates and terminates in the same state. In a "packet-switched network," the analysis is not so simple, as "[a]n internet communication does not necessarily have a point of 'termination' in the traditional sense." FCC Ruling, 14 FCC Rcd at 3701-02 (¶ 18). In a single session an end user may communicate with multiple destination points, either sequentially or simultaneously.[51]

The court noted that a call to an ISP is not quite long distance, though some internet communications might take place between the ISP and computers that are out-of-state, "because the subsequent communication is not really a continuation, in the conventional sense, of the initial call to the ISP."[52] The FCC's rules indicated that, because the telephone call used to establish the dial-up connection "terminates" at the called party's premises, for calls to dial-up ISPs, the ISP is "clearly the 'called party.'"[53] In other words, the ISP's switch is the "point" specified by a dial-up

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[49] *Id.* at ¶ 6.

[50] *Bell Atl. Tel. Companies v. FCC*, 206 F.3d 1, 3 (D.C. Cir. 2000).

[51] *Id.* at 5.

[52] *Id.*

[53] *Id.* at 5-6.

user to send and receive "telecommunications" transmissions when making a dial-up call. But, once the ISP receives a dial-up call, it "originate[s] *further* communications to deliver and retrieve information to and from distant websites."[54]

After a further remand and mandamus, the FCC determined that ISP-bound traffic is interstate, interexchange traffic, but that it should be afforded different treatment from other such traffic (i.e., exempted from ordinary access charges) pursuant to the FCC's authority under 47 U.S.C. §§ 201 and 251(i).[55] This time, the D.C. Circuit upheld the FCC, because dial-up internet traffic is "special" in that it involves "interstate communications that are delivered through local calls," and thus implicates provisions governing local and long distance communications simultaneously.[56] Because the petitioners had not challenged the applicability of the FCC's end-to-end analysis jurisdictional analysis, and petitioners did not dispute that dial-up internet traffic extends from the user to the internet, "or that the *communications*, viewed in that light, are interstate," the court concluded it "has no significance for the FCC's § 201 jurisdiction over *interstate communications* that these *telecommunications* might be deemed to "terminat[e]" at a LEC for purposes of § 251(b)(5)."[57] The court's careful distinction between interstate internet "communications" on the one hand, and local "telecommunications" on the other, is instructive.

All internet services undoubtedly involve "communications," but that does not mean that they undoubtedly involve "telecommunications" as that term is defined in the Act. The fact that broadband transmissions do not fit within any of the other transmission types defined in the Communications Act does not mean broadband transmissions must therefore be "telecommunications." Similarly, the fact that broadband services do not fall within any of the other services defined in the Act does not mean broadband services must therefore be defined as

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[54] *Id.* at 6.

[55] *See* Intercarrier Comp. for ISP-Bound Traffic, Order on Remand and Report and Order and Further Notice of Proposed Rulemaking, FCC 08-262, 24 FCC Rcd. 6475, ¶ 6 (2008).

[56] *See Core Commc'ns, Inc. v. FCC*, 592 F.3d 139, 144 (D.C. Cir. 2010).

[57] *Id.* at 144.

either "telecommunications services" or "information services" (the only communications services defined by reference to "telecommunications"). It simply means that broadband services are subject to the FCC's jurisdiction under Title I, just like cable services were before Congress added a definition for cable services in the first cable act.

Broadband users do not specify "points" of transmission

Unlike dial-up internet connections, which originate with an phone call placed on the PSTN that terminates at a known point, broadband transmissions *originate in internet protocol* and do not have a known point of termination.[58] When the FCC preempted state relegation of broadband "voice over internet protocol" (or "VoIP") services in the *Vonage Order*, the FCC recognized that, "in *marked contrast* to traditional circuit-switched telephony," broadband connections "originate on the internet."[59] Though the jurisdictional decision in the *Vonage Order* was based on the FCC's traditional "end-to-end analysis," and did not reach the issue of classification expressly, an end-to-end analysis requires the FCC to define the "end points" of a transmission.[60] Under this analysis, the FCC analyzes the "'continuous path of communications,' beginning with the end point at the inception of the communication to the end point at its completion."[61] The FCC found that broadband communications are jurisdictionally mixed because they lack *any* definable points: The geographic location of the end user *and* the geographic location of the "termination" point of a broadband communication are both "difficult or impossible to pinpoint."[62] This "impossibility" results from the "inherent capability of IP-based services" to enable users to "access different websites or IP addresses during the same

[58] *See* Vonage Holdings Corp., Memorandum Opinion and Order, FCC 04-267, 19 FCC Rcd. 22404, ¶ 6 (2004).

[59] *See id.* at ¶¶ 4-9 (emphasis added). Indeed, referring to the services provided by ISPs as internet "access" services is a misnomer that has been held over from the dial-up era. A broadband user is "accessing" the internet as soon as a broadband transmission leaves the user's home router.

[60] *See id.* at ¶¶ 14, 17.

[61] *Id.* at ¶ 17.

[62] *See id.* at ¶ 25.

communication session and to perform different types of communications simultaneously, none of which the provider has a means to separately track or record."[63]

The "total lack" of definable "points" is the primary distinction between packet-switched broadband transmissions and the circuit-switched telephone transmissions.[64] In contrast to the circuit switching of the PSTN, the internet uses "routing" to enable the transmission of information *without* specifying a specific path (i.e., circuit) or end point.[65] All internet applications (e.g., email or web browsing) use internet protocol (i.e., the rules governing how internet messages are transmitted and received), which is designed to enable devices to connect *indirectly* — i.e., device "A" can send a message to device "B" without knowing where it is on the network. IP accomplishes this by dividing internet transmissions into discrete portions known as "packets" that are sent individually, thus eliminating the need for a dedicated circuit. Each packet contains addressing information in its "header." This information is used to route packets dynamically to one or more destinations using one or more paths. The process of transmitting an IP message from one network to another is called "forwarding," and the collective process of forwarding messages from one device to another is called "routing."

Internet Routing Is Indirect

Internet routing obviates the need to establish a *direct* connection (e.g., a dedicated circuit) between specified points prior to starting a transmission.[66] Because packets can be freely intermingled, packet switching allows many devices to communicate simultaneously using the same wire or cable.

The internet protocol suite has a system for identifying and addressing devices on both local networks and between networks. Each device on a local network has a *unique* number

[63] *Id.*

[64] *See Id.*

[65] *See* Charles M. Kozierok, The TCP/IP Guide, available at http://www.tcpipguide.com.

[66] The process of transmitting an IP message from one network to another is called "forwarding," and the collective process of forwarding messages from one device to another is called "routing."

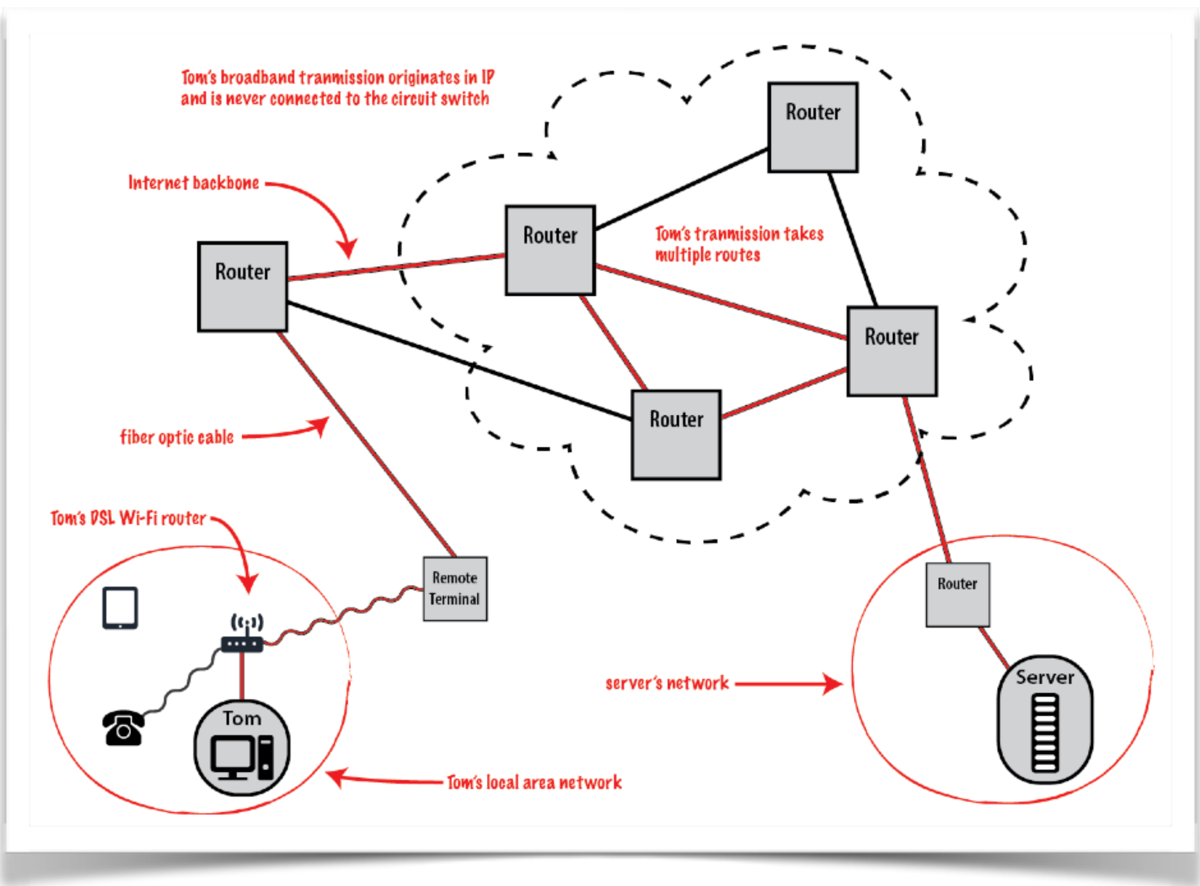
known as a “hardware address” (or “MAC address”), i.e., each MAC address refers to a specific physical device on a local network. MAC addresses are used for transmissions between hardware devices on a local network that are *directly* connected. Each device connected to the internet is also *associated* with an “IP address.” IP addresses are *independent of particular hardware* (i.e., logical) and are used to create a “virtual network” for *indirect* transmissions between or among local networks (i.e., “internetworking”).

Unlike a 10-digit telephone number, which identifies a specific loop or mobile device, an IP address does not identify a specific device; an IP address identifies only the *interface* (“host” or “network interface”) between a specific device and the internet. The main components of an IP address are a “Network Identifier” (or “Network ID”), which identifies the network where the host is located, and a “Host Identifier” (or “Host ID”), which identifies the host on the network. Each internet router maintains a “routing table” that maps different Network IDs and the other routers to which the router is connected. Each entry in the table contains information about one network (or subnetwork or host) indicating the routes that lead to that destination. Each time a router receives a packet, it compares the destination IP address to the entries in its routing table to decide where to send the packet next. The process of routing is what allows a device to send transmissions to any other device on the internet without specifying an endpoint or even knowing where the endpoint is.

The use of “logical” IP addresses solves the basic problem of connecting different networks: That actual transmissions between devices use MAC addresses, but each device on a local network only knows (or can directly discover using “address resolution protocol”) the MAC addresses of the devices that are directly connected to that network.

For example, assume Tom is using an xDSL broadband connection and wants to access information that is associated with the URL http://www.fcc.gov. As depicted in Figure 9, Tom cannot directly connect to the server that has this information even if Tom knows the server’s MAC address, because the server is on a different network, and neither Tom nor his computer knows where the server's network is located. Tom must instead send his message using the server's IP address, which enables routers to forward the message from one physical network to the next, one step (or "hop") at a time. At each hop, a router determines where to forward the message next until it reaches the host, which knows (or can discover) the server's MAC address and forward the message to its final destination. Note that, if a particular route is congested, Tom's transmissions may take multiple paths, and there is no way for Tom to specify or even know the points of his transmissions.

Figure 9. Internet Routing



Also note that Tom's xDSL connection is "always on." Unlike the dial-up internet, no PSTN call is required to "access" the internet — Tom's personal router and telephone line are a part of the internet itself. Indeed, Tom's "telephone" line is no longer directly connected to the circuit switch in the central office. It is instead connected to an IP-based "digital subscriber line access multiplexer" ("IP-DSLAM") located in a remote terminal in Tom's neighborhood (usually in a green metal box), and the remote terminal (or "node" or "Serving Area Interface") is connected to the central office by a fiber optic connection. The IP-DSLAM converts analog voice transmissions to IP data and multiplexes the converted voice data with the IP data generated by Tom's computing devices.

The World Wide Web

The "World Wide Web" (or "web") is arguably the most important internet application. The web's appeal is that it easily allows related documents and media to be "hyperlinked" together using "Hypertext Transfer Protocol" (or "HTTP"). HTTP is a server-client oriented application. Its primary function is to transfer files from web servers to user devices (or "clients"). In terms of actual communication, clients are primarily used to *request* information from web servers, which *respond* to those requests with the information sought by the user.

The earliest version of HTTP was very simple, but quickly overloaded the internet when its popularity exploded. Many of the features introduced in subsequent versions were designed to reduce the bandwidth consumed by repetitive HTTP requests and responses. These features include "proxying" and "caching."

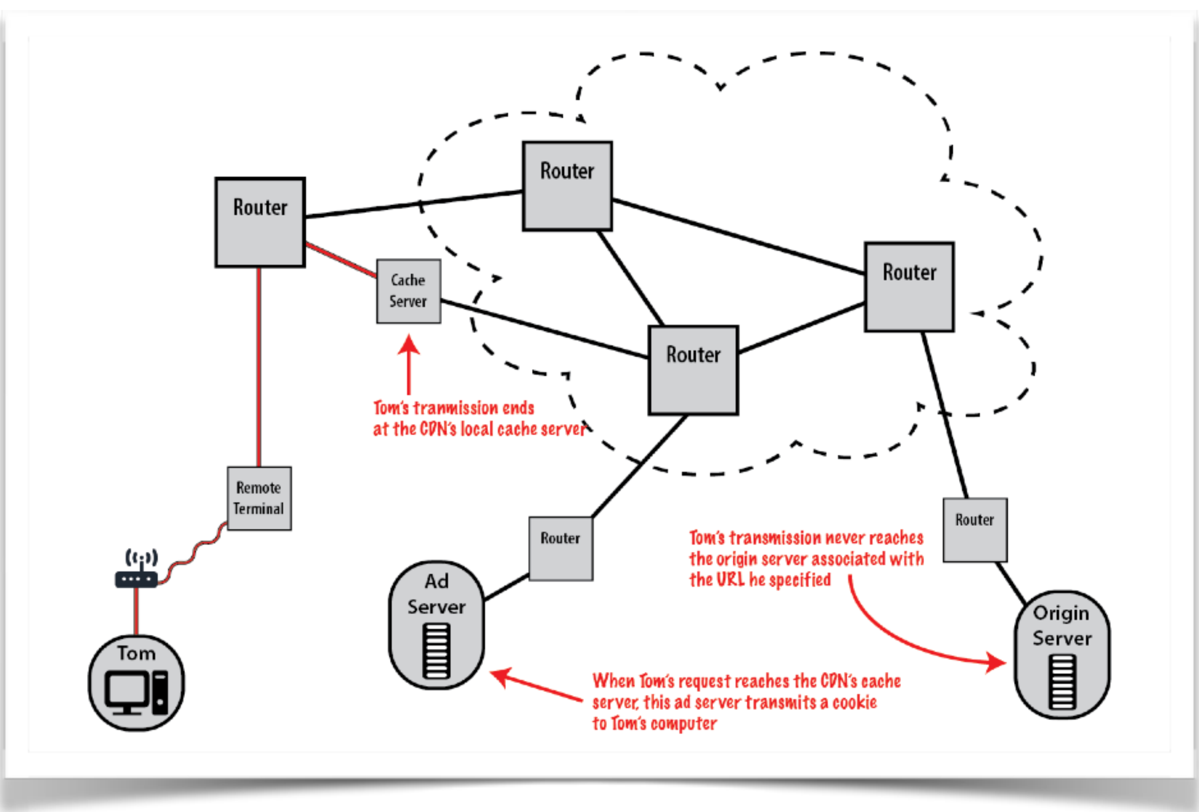
A "proxy server" (or "surrogate") is a server that acts as an intermediary for requests from clients seeking information from other servers.

A "cache" stores web information on a device that a client is likely to request repeatedly so that a web server does not need to resend the information whenever the client makes a new information request. A cache can be implemented on any device, including a client device ("web browser cache") or an intermediary device between a client and a web server ("intermediary" or "proxy" caching). If a user wants information that is not already in the client's cache, an intermediary cache server might be able to provide the information. This is not as efficient as retrieving the information from the client's local cache, but it is far more efficient than sending the request to the actual origin server, and unlike the local client's cache, a cache server has the advantage of being available to multiple clients. Content delivery networks (or "CDNs") typically use cache servers extensively in the provision of their services.

A cache server on the web typically appears to clients (i.e., end user computers) as the origin server, which means that, though the client's user may not realize it, a client request for information from a particular URL (i.e., the end user's transmission) that is responded to by a cache server *never actually reaches* the origin server.

For example, in Figure 10, when Tom types a URL into his web browser and hits enter, the web page associated with that URL is served by a cache server administered by a content delivery network rather than the origin server where the information was originally uploaded. Moreover, when Tom's request reaches the cache server, it may result in numerous additional transmissions from multiple additional servers. For example, any server to which a request is sent can transmit a "cookie" to the client (the user's computer), and that server can also enable the transmission of "third party cookies" to that user's computer from multiple servers in multiple locations that are typically unknowable by the user, let alone "specified" by the user as transmission "points."

Figure 10. World Wide Web Communications

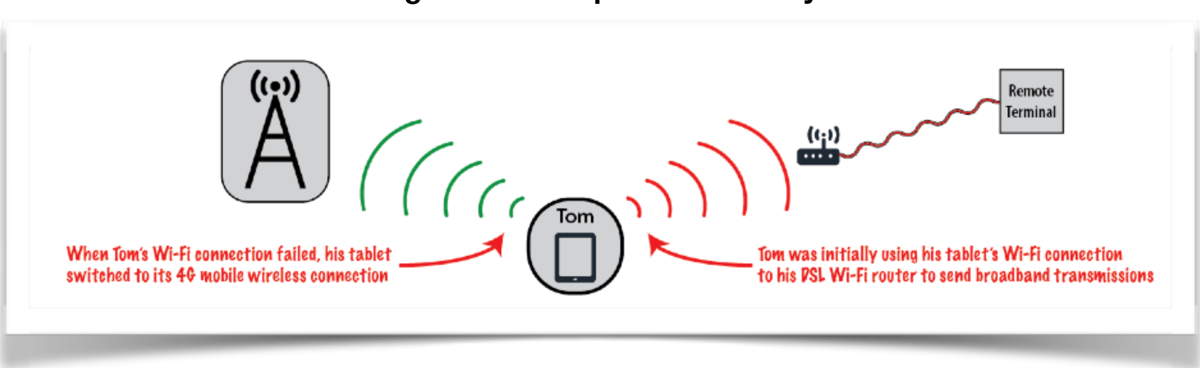


In short, it is literally *impossible* for a broadband user to specify the "points" of an internet "transmission" on the web as required by the definition of "telecommunications" in 47 U.S.C. § 153(50). When a user types a URL into a web browser, the user is not specifying the *endpoint for a transmission*; the user is specifying the original *source of the information* the user wants to retrieve. In stark contrast to a call on the PSTN, the endpoint of a user's URL-based broadband transmission is routinely different from its original source — and that fact is largely irrelevant to the user.

Devices with Multiple Connectivity

The simplified illustrations above indicate that the path of broadband transmissions in the "last mile" is static. In reality, however, the paths taken by a user's broadband transmissions are often dynamic at all points, because many devices today have more than one broadband connection to the internet. Smartphones and tablets often have both a Wi-Fi connection and a 3G or 4G broadband connection to a mobile service provider, and computers often have both those connections as well as a wired ethernet connection. Though users can specify which broadband connection they wish to use, most devices come with default preferences, and some devices automatically switch connections to optimize throughput. As a result, a user may not even be aware of the very first point reached by the user's broadband transmissions, as illustrated in Figure 11.

Figure 11. Multiple Connectivity



Broadband transmissions are not of the user's choosing and inherently change the form and content of the information transmitted

For the reasons explained above, broadband transmissions also fail to meet the third and fourth elements of the definition of "telecommunications," that the transmission is "of the user's choosing" and there is no "change in form or content."

Figure 10's illustration of third party cookies is an excellent example of the lack of choice inherent in many broadband transmissions. Neither Tom nor the owner of the web page Tom visited "chose" to send the third party cookie to Tom's computer. The cookie was chosen by a third party ad network with whom the end user has no relationship.

Broadband transmissions also change form and content as they are transmitted and received. For example, the form of broadband packets are routinely changed during network address translation, a feature that is inherent to the routing process.

Regulating broadband internet access as a "telecommunications service" is inconsistent with the structure of the Communications Act

The structure of the Communications Act supports this conclusion as well. The Communications Act regulates communications services, and the different titles of the Act generally regulate different types of communications services.

- Title II governs telecommunications services;
- Title III governs radio services; and
- Title VI governs video services.

At the title level, these service categories are defined by reference to the capabilities of the networks that have historically been used to provide them.

- Telecommunications services (e.g., plain old telephone service) were traditionally provided using wired networks that were incapable of providing radio or video services;

- Radio services (e.g., broadcasting and commercial mobile radio service) are provided without wires; and
- Video services (e.g., cable and broadcast satellite) were generally provided using networks that were incapable of providing telecommunications services.

Broadband transmissions offer *all* of the capabilities in Titles I, II, and III simultaneously — they are all of the above — because they are network agnostic. It would be arbitrary, capricious, and contrary to law to regulate a service that is substitutable for any other service in the Communications Act as if it were only *one* of those services exclusively. Why choose "telecommunications service" and not "cable service" as the appropriate service category when broadband internet access offers the capabilities of both *from the end user's perspective*? To rely on the Brand X rule, which elevates the consumer's perspective above the Act's definitional terms, the FCC must articulate a rationale for choosing one definitional category over another, and the nature of broadband transmissions makes the task impossible.

The FCC has regulatory authority over broadband services under Title I

This does not mean the FCC has no regulatory authority over broadband services. Broadband services stand in the same position as cable service stood prior to the adoption of the 1984 Cable Act: broadband service is subject only to the FCC's ancillary authority under Title I until Congress decides to act.